

REMARKS/ARGUMENTS

Reconsideration and allowance of this application are respectfully requested. Currently, claims 57-116 are pending in this application.

Request to Acknowledge Receipt of Certified Copies of Priority Documents:

Applicant notes with appreciation the Office Action's acknowledgement of Applicant's claim for foreign priority under 35 U.S.C. §119 (see checked box 12 on Form PTOL-326). Applicant respectfully requests that the next Office Action acknowledge receipt of the certified copy of the priority document. A certified copy of priority application no. GB 0002857.1 has been filed in prior application no. 10/203,547.

Objections to the Specification:

The specification was objected to for failing to include section headings and because "the spacing of the lines of the specification is such as to make reading and entry of amendments difficult." Applicant has attached hereto a substitute specification. The lines of text of the substitute specification have been appropriately spaced as recommended by the Office Action. The substitute specification also includes appropriate section headings. Applicant therefore respectfully requests that the objections to the specification be withdrawn.

A marked-up copy of the substitute specification showing all of the changes relative to the prior version of the specification is also attached hereto. Applicant hereby states that no new matter has been included in the substitute specification.

Claim Objections:

The claims were objected to “because the lines are crowded too closely together, making reading and entry of amendments difficult.” Claims 1-56 have been canceled. New claims 57-116 includes lines of text with appropriate spacing therebetween. Applicant therefore requests that the objection to the claims be withdrawn.

Rejection Under 35 U.S.C. §112:

Claims 15 and 22 were rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite. In particular, the Office Action stated “The limitation ‘preferably’ is not clear and indefinite.” Claims 15 and 22 have been canceled. None of new claims 57-116 includes the word “preferably.” Applicant therefore requests that the rejection under 35 U.S.C. §112, second paragraph, be withdrawn.

Double Patenting:

Claims 1-56 were rejected under the judicially created doctrine of obviousness-type double patenting as allegedly being unpatentable over claims 20 and 270-323 of co-pending application no. 10/203,547. Claims 1-56 have been canceled. Applicant has attached hereto a Terminal Disclaimer disclaiming the terminal part of a patent granted from the present application which would extend beyond the expiration date of the full statutory term of any patent issuing from application no. 10/203,547. Applicant therefore submits that any potential

provisional obviousness-type double patenting rejection of the presently pending claims has been overcome.

Rejections Under 35 U.S.C. §102 and §103:

Claims 1-6, 8-10, 19-23, 28-31, 33-44, 47-50, 55 and 56 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by Oswald et al (WO 98/00729, hereinafter "Oswald").¹ Claims 17, 18, 24 and 51 were rejected under 35 U.S.C. §103 as allegedly being unpatentable over Oswald. Claims 7, 11, 13, 14 and 16 were rejected under 35 U.S.C. §103 as allegedly being unpatentable over Oswald in view of Hane et al (WO 86/00716, hereinafter "Hane"). Claims 25-27 were rejected under 35 U.S.C. §103 as allegedly being unpatentable over Oswald in view of Kerry et al (WO 97/14058, hereinafter "Kerry"). Claims 46 and 52-54 were rejected under 35 U.S.C. §103 as allegedly being unpatentable over Oswald in view of Chen et al (U.S. '915, hereinafter "Chen"). Claim 45 was rejected under 35 U.S.C. §103 as allegedly being unpatentable over Oswald in view of Breed et al (U.S. '782, hereinafter "Breed").

Claims 1-56 have been canceled. New claims 57-116 have been added. Applicant submits that none of the new claims is anticipated by or "obvious" over Oswald. Applicant further submits that none of the new claims is "obvious" under 35 U.S.C. §103 over Oswald in view of any of the above-identified secondary references (Hane, Kerry, Breed and Chen).

Independent claims 72 and 78 correspond to previous (and now canceled) claims 12 and 15 rewritten in independent form. Claims 12 and 15 were not rejected under 35 U.S.C. §102 or §103 in the Office Action. Claims 72 and 78 and their respective dependents are therefore allowable.

Independent claim 57 requires, *inter alia*, “a detector, coupled to the receiver, for detecting the timing of the returned probe signals as received at one of the plurality of spaced apart locations relative to the timing of the returned probe signals as received at one or more other of the plurality of spaced apart locations.” Independent claim 115 requires a similar feature. Applicant submits that the cited prior art, alone or in any combination thereof, fails to teach or suggest this feature. For example, Oswald is concerned with only the time between transmission of a signal from a transmitter and receipt of the signal at a receive antenna. The range of the object from a receiver is then obtained using that time between transmission and receipt.

The embodiment illustrated in Fig. 7 of Oswald includes a single transmitter 100 and three receive antennas 102, 104 and 106. In this embodiment (see, e.g., page 20, paragraph 3), Oswald is again concerned only with the time between transmission and receipt for each receive antenna considered separately, from which the range of the object from each receiver can be obtained separately.

¹ Applicant notes that the named Applicant of WO 98/00729 is Cambridge Consultants Limited, the assignee of the present application.

Those separately obtained ranges can then be combined in a triangulation process.

The signal received at each receive antenna 102, 104 and 106 is therefore processed separately from a signal received at any other receive antenna.

In contrast, claims 57 and 115 require that the signal received at each receiving element is considered relative to the signal received at at least one other receiving element. This enables the relative timing of the signal received at one receiving element compared to the signal received at the or each other receiving element to be detected. The relative timing information is then processed to determine the angular position of the object. The signals received at different receiving elements in the invention of claims 57 and 115 are therefore considered together in order to obtain position information, whereas Oswald discloses the separate processing of signals received at each receive antenna to obtain positional information.

Claim 57 further requires “the receiving element are spaced apart by distances that are the same order of magnitude as the wavelength λ of radiation that the apparatus is intended to transmit and receive.” Independent claim 115 requires a similar feature. Page 10, lines 5-7 of the Office Action admits that Oswald fails to disclose this feature. The Office Action, however, alleges that it would have been obvious to modify Oswald’s system to have receiver element spacing equal to the wavelength of the radiation, depending on the range and sweep of a system.

However, pages 16 and 17 (specifically identified by the Office Action) make no mention of the variation of the spacing of the receive antennas. Rather, pages 16 and 17 provide a description of a variation of range gates, apparently for a single transmitter and receiver. A range gate for a particular receiver is a distance (or a range of distances) between the receiver and the object from which a signal is reflected, and is proportional to the time between transmission of a signal, reflection of the signal from the object and detection of the reflected signal at a receive antenna. It is not dependent on receiver spacing.

While page 4, paragraphs 1 and 2 and page 19 of Oswald discuss the use of a plurality of receivers, each receiver has associated transmitter and the receivers are intended to be mounted as far apart as possible to provide the widest possible field of view. For example, page 4, paragraph 1 states "...adapted to be mounted at a diagonally opposite corner regions of the vehicle." Pages 20 and 21 of Oswald deal with receipt of a signal at more than one receiver in relation to the embodiment illustrated in Fig. 7. However, this passage of Oswald fails to provide any discussion at all concerning the desired spacing of the receivers.

Accordingly, Oswald provides no teaching, suggestion or motivation that the receiving antennas be spaced apart by distances that are the same order of magnitude as the wavelength λ of the radiation that the apparatus is intended to transmit and receive. If anything, the above-identified passages of Oswald teach

away from this feature. None of the cited secondary references remedy this deficiency of Oswald.

Independent claim 63 requires "...at least three receiving elements are arranged non-collinearly and such that there is no axis about which the array is symmetrical." Page 6, lines 15-16 of the Office Action alleges "Oswald discloses in figure 7 the at least three receiving elements are arranged such that there is no axis about which the array is symmetrical." Applicant respectfully disagrees with this allegation. In Oswald's Fig. 7, an axis of symmetry extends vertically from receive antenna 106 through transmitter 100 and passes through the mid-point of a line separating antennas 102 and 104. Applicant thus submits that Oswald fails to disclose the above feature of claim 63 and its dependents.

Independent claim 80 requires first and second pairs of receiving elements, the first and second pairs having dissimilar artefacts in their sensitivity patterns. Independent claim 116 requires a similar feature. None of the cited prior art is concerned at all with artefacts in the sensitivity patterns of pairs of receiving elements.

OSWALD et al.
Application No. 10/603,608
December 8, 2004

Conclusion:

Applicant believes that this entire application is in condition for allowance and respectfully requests a notice to this effect. If the Examiner has any questions or believes that an interview would further prosecution of this application, the Examiner is invited to telephone the undersigned.

Respectfully submitted,

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AMENDMENTS TO THE DRAWINGS

The attached sheet of drawings includes changes to Fig. 3. This sheet, which includes Fig. 3, replaces the original sheet including this figure. In Fig. 3, appropriate labels have been added to block diagrams, previously omitted reference numerals “82” and “84” have been added, and reference label “88” has been deleted.

Attachment: Replacement Sheet
Annotated Sheet Showing Changes

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FIG. 3

